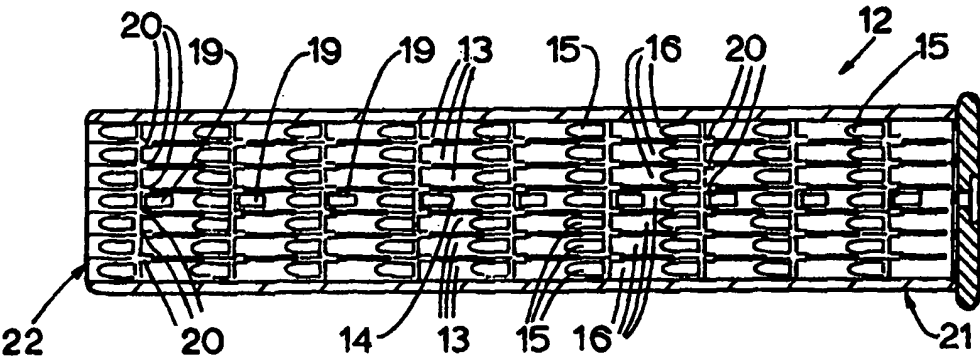




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/AU98/00415 (22) International Filing Date: 2 June 1998 (02.06.98) (30) Priority Data: PO 7158 3 June 1997 (03.06.97) AU (71)(72) Applicant and Inventor: O'DWYER, James, Michael [AU/AU]; 12 Peppertree Street, Sinnamon Park, QLD 4073 (AU). (74) Agent: PIZZEYS PATENT & TRADE MARK ATTORNEYS; Level 6, 444 Queen Street, Brisbane, QLD 4000 (AU).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>With amended claims.</i>
(54) Title: FIREARMS  (57) Abstract <p>This invention provides a handgun assembly such as a rifle (9) which has a barrel assembly (24) including a cluster of barrels each supporting a longitudinal arrangement of aerodynamically shaped, directional projectiles (15) and interposed propellant charges (16) whereby the barrel assembly has longitudinal arrays or layers of projectiles and interposed propellant charges. Ignition means is provided for selectively igniting the propellant charges (16) including for simultaneously igniting the propellant charges in the leading layer of projectiles to provide a shotgun-like blast.</p>		

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"FIREARMS"**TECHNICAL FIELD**

The invention relates to firearms.

This invention has particular, but not exclusive,
5 application to a handguns including shotgun type firearms
which utilise barrels such as the barrels described in my
earlier International Patent Applications Nos. PCT/AU94/00124
and PCT/AU96/00459.

Such barrels each have a plurality of projectiles
10 stacked axially within the barrel together with discrete
selectively ignitable propellant charges for propelling the
projectiles sequentially through the muzzle of the barrel and
the sealing engagement between projectiles and barrel being
such as to prevent rearward travel of the ignited propellant
15 charge to trailing propellant charges. These barrels will
be referred to hereinafter as of the type described.

BACKGROUND ART

This invention aims to alleviate perceived shortcomings
in conventional weapons such as shotguns which fire a
20 collection of round pellet like shot randomly oriented in the
cartridge, which when fired exit from a relatively large bore
barrel in a random orientation and at a relatively slow
muzzle velocity.

The shot immediately disperses to cover a relatively
25 large target zone. This effect is useful but the effective
range of the shot is very short. Shotguns also require
reloading between shots and this reduces their effectiveness.

Handguns such as pistols also have significant
limitations for many reasons including the limited number of
30 shots which may be contained in the weapon and the relatively
slow rate of fire available. However they are very portable
and concealable and this makes them very useful.

DISCLOSURE OF INVENTION

According to one aspect this invention resides broadly
35 in a handgun assembly having:-

a cluster of small bore barrels of the type described each having a longitudinal arrangement of aerodynamically shaped, directional projectiles and interposed propellant charges whereby the barrel assembly has longitudinal arrays
5 or layers of projectiles and interposed propellant charges arranged in longitudinally spaced relationship in their respective barrels, and ignition means for simultaneously igniting the propellant charges in a respective layer of propellant charges.

10 According to one aspect this invention resides broadly in a handgun assembly having:-

a barrel assembly including a cluster of barrels of the type described;

each barrel including a longitudinal arrangement of
15 aerodynamically shaped, directional projectiles and interposed propellant charges whereby the barrel assembly has longitudinal arrays or layers of projectiles and interposed propellant charges, and

ignition means for simultaneously igniting the
20 propellant charges in a respective layer of propellant charges.

The may form the entire barrel assembly of the handgun or the barrel assembly may constitute only a portion of the handgun's barrel assembly, such as by being a replaceable
25 cartridge communicating with fixed barrels in the handgun. The barrels may be parallel or may splay slightly to achieve a desired firing pattern.

Each barrel could have its own electronic ignition means. Preferably however the barrels are clustered about
30 one or more ignition passages extending substantially parallel to the barrels and communicating therewith through longitudinally spaced arrays of transverse bleed passages whereby selectively initiate ignition of primers in the or each ignition passage spreads through the respective aligned
35 one of the longitudinal array of transverse bleed passages

and causes ignition of the respective propellant charges communicating therewith.

The barrels may also be clustered about one or more bypass passages extending substantially parallel to the
5 barrels and communicating therewith through a valved port communicating with longitudinally spaced arrays of transverse bleed passages whereby in the event of an accidental ignition of a primer in a trailing round, the valved port will open to enable the ignited propellant charges to bleed to atmosphere
10 through the bypass passage.

Alternatively, individual barrels may be provided with valved ports enabling each to discharge to a bypass passage in the event of a hang fire or the like accidental ignition of a trailing propellant charge. Suitably the valved port is
15 in the form of a plugged port in which the plug will be dislodged at a preselected pressure above the normal operating pressures within the barrels.

The handgun may be in the form of a shotgun and have a large number of small bore barrels clustered about the or
20 each ignition passage, but preferably a central ignition passage. The ignition passage may constitute a main barrel provided with primer initiation means for selective initiation of the propellant charges therein. The main barrel is suitably the centre barrel and may have a larger
25 bore than the others if desired.

For example, a cluster of approximately sixty-four 2mm barrels could be provided. This provides a shotgun in which all the simultaneously fired projectiles are individually
barrelled. The projectiles would be in the order of 2mm
30 diameter and 5mm in length. If the leading primer in the main barrel is ignited, then all sixty-four projectiles in the leading layer will be fired.

The barrels may be rifled and the projectiles may be loaded therein in cartridges. Alternatively the barrel may
35 be provided as a disposable barrel containing the projectiles

and propellant charges stacked therein.

The cartridges could align with a single large open barrel of the shotgun but preferably the barrels of the cartridge align with correspondingly arranged small bore
5 barrels in the shotgun. For this purpose the cartridge is provided with locating means for locating it in operative alignment with the shotgun barrels and most preferably the cartridge has a square section housing for operative location with any of its rectangular side faces entered through the
10 loading\ejecion port. This port could be a side, top or underside port.

Any number of groups of sixty-four pellets/projectiles may be fired at any electronically available rate. This provides on the one hand, a low degree of lethality in the
15 case where say a single group of pellets is fired, or an exceedingly high degree of lethality if a number of groups are fired in rapid succession. The weapon may be operated as a shotgun machine-gun.

The primer initiation is suitably electronically
20 controlled and may be electrical, chemical, laser, mechanical or any other available means as is appropriate.

DESCRIPTION OF PREFERRED EMBODIMENTS

In order that this invention may be more readily understood and put into practical effect, reference will now
25 be made to the accompanying drawings which illustrate typical embodiments of the invention, wherein:-

FIGS. 1 and 2 illustrate typical shotguns according to this invention;

FIG. 3 is a diagrammatic sectional view of a shotgun
30 cartridge for the shotguns illustrated in Figs. 1 and 2;
FIG. 4 is an end view of the cartridge illustrated in Fig. 2;

FIGS. 5A to 5D illustrate loading of one preferred form of revolver;

35 FIGS. 6A and 6B illustrate loading of a further

preferred form of revolver;

FIG. 7 illustrate the removal of electronic control means for disarming the revolvers;

FIG. 8 illustrates one form of cartridge which may be
5 used with the handgun of Fig 6, and

FIG. 9 illustrates a further form of clustered barrel assembly.

The shotguns 9 and 10 illustrated in Figs. 1 and 2 are similar to the Smith & Wesson AS and the Remington 870 twelve
10 gauge shotguns respectively and have similar loading and unloading features.

However in each case, the feed/ejection port 11 has been lengthened to accept a multi-barrel cartridge 12 as illustrated in Figs. 3 and 4 which contains sixty (60) 2mm
15 bore barrels 13 arranged symmetrically about a central main barrel 14, with nine longitudinally spaced layers of streamlined directional projectiles 15 and associated propellant charges 16 therein.

The main barrel 14 is provided with electrical
20 connections controlled from electronic control means located in the butt of the shotgun and activated by the trigger 18 in conventional manner. The electrical connections are controlled for selective ignition of the primers 19 in the respective propellant charges 16 and an array of bleed ports
25 20 is provided to place the corresponding propellant charges 16 in the barrels 13 in communication with the respective propellant charges in main barrel 14.

Upon ignition of the leading propellant charge 16 in the main barrel 14, the explosion front will spread through the
30 bleed ports 20 and ignite all the propellant charges in the corresponding layer.

The barrels 13 are clustered in a circular configuration about the main barrel 14 and are supported in a square sectioned housing 21 which may be introduced into the port 11
35 feed end 22 first in any desired rotational attitude. The

square housing 21 is used to positively locate the cartridge in the shotgun body 23 in alignment with the correspondingly clustered barrel assembly 24 extending from the body 23.

In operation of the shotgun illustrated in Fig. 9, when its controls are set to fire single arrays of projectiles 15 at a time, the bolt may be locked for manual cocking, in which case the recoil is negated. However if three or more layers of projectiles 15 are to be fired substantially simultaneously, such as to empty the operative cartridge, the bolt may be unlocked to enable the recoil action to automatically cock the weapon for its next firing, including ejection of the fired cartridge.

The shotgun illustrated in Fig. 2 utilises a pump action for reloading cartridges in conventional manner. The projectiles 15 are suitably formed with a reverse wedging sealing arrangement as described in my corresponding International application filed 1 June, 1998 or they may utilise a forward wedging arrangement as described in my earlier filed International patent applications set out above.

Figs. 5, 6 and 7 herewith illustrate two pistols according to further aspects of the present invention. The illustrated pistols include a four barrel pistol 40 in which the barrel assembly 41 is removable from the hand grip assembly 42 and a two barrel pistol 50 in which the barrel assembly 51 breaks from the hand grip assembly 52 for reloading.

Referring firstly to the four barrel pistol 40, it will be seen that the barrel assembly 41 which comprises four integrated barrels clustered together and provided with an integral mounting 43 which enables the barrels to be clipped into a cradle assembly 44 which extends above and forwardly of the hand grip 42.

Suitable latching means 45 are provided for maintaining the barrel assembly in its operative position in the cradle

assembly 44. The process of removal of the barrel assembly 41 is illustrated sequentially in the drawings. In the first step illustrated in Fig. 5B, the barrel assembly 51 is withdrawn longitudinally from the end cap 47 which contains 5 concentrically arranged electrical contacts 48 which mate with corresponding contacts in the end of the barrel assembly 41 to provide electrical ignition control of the propellant charges therein.

Because the barrel assembly 41 can be readily detached 10 and attached to the cradle assembly 44, this pistol assembly 40 offers the advantage that a user may carry alternate style barrel assemblies for firing different types of projectiles or for rapid reloading should one barrel assembly be emptied or required to be changed in use.

15 All barrels need not contain the same projectiles. One or more could for example contain a shotgun barrel as described above if desired while the others may contain banks of single projectiles with the same or different propellant charges. Selection switches would be provided to enable a 20 user to fire selected or all barrels. Alternatively they could be mounted about a main passage with bleed passages for simultaneous ignition of all rounds in each respective layer of projectiles.

The barrel assemblies 41 can be of a disposable form or 25 they may be adapted to receive reload cartridges which are inserted into the rear of the respective barrels. Suitable release claws or the like are also supported on the upstanding butt portion 46, which is integral with the hand grip 42, catch the cartridges upon release of the barrel to 30 effect partial withdrawal of spent or partially spent cartridges and thus facilitate their removal for replacement.

If desired the barrel assembly 41 may be supported on a slide and associated with recoil or damping means to minimise the reaction upon firing. This recoil would be particularly 35 useful in an instance where a user required to fire a number

of projectiles simultaneously or in quick succession. That is operation of the pistol 40 in normal manner would provide the normal controllable reaction.

However if the rapid fire facilities available to a user of handguns of the present invention are utilised, the reaction, without damping may render the handgun uncontrollable. Thus a recoil mechanism for handguns programmed with a rapid fire facility, such as is illustrated in Fig. 8, would be most desirable.

10 The two barrel pistol 50 illustrated in Fig. 7 has the barrel assembly 51 arranged for pivotal movement at the front end of the cradle 53 so that the barrel may be broken for reloading with cartridges. The pistol 50 receives double tap
15 cartridges 54 of the type described in my International Patent Application No. PCT/AU96/00459. This is particularly significant in relation to hand guns of the present invention in that the cartridges loaded into each of the barrels may be of different configuration and be operable so that an operator may selectively fire rounds from either barrel such
20 as rounds which have a low lethality or rounds which have a high lethality.

In both pistols 40 and 50 actuation is by means of a trigger which is in effect an electronic switch. This switch could be sensitive to displacement and/or pressure to enable
25 trained personnel to operate the weapon for selective firing of single or multiple rounds and of different types.

The pistol assembly 50 has a control insert 55 which fits into a complementary recess in the pistol grip 52, or grip 42 of pistol 40, and which contains the electronic
30 firing controls, memory for storing recorded data and other required electronics, including diagnostics. The plug-in insert 55 includes a multipin connector at its inner end which engages with a complementary connector when the insert is pushed into the grip 52 to the fully home position. At
35 the base of the insert 55, a further multipin connector 57 is

provided to enable the electronics therein to be accessed to enables programming of the electronics and display of stored data for desired functions and results on a screen.

Concentrically arranged contacts 58 are provided for barrel control.

The insert 55 enables a user to secure the pistol against unauthorised use. If desired further security measures may be taken as is describe in one of my co-pending International Patent Applications.

10 Fig. 8 illustrates a collapsible stack 60 formed of shock absorbing material 61 and disposed at the rear end of an electronically fired round 63. The stack 60 has sections 62 which collapse progressively upon firing the projectiles in the round. In this manner, recoil damping can be built
15 into a fixed barrel weapon which uses replaceable cartridge assemblies. Furthermore, an operator may use rounds with or without the damping means.

The barrel assembly 70 illustrated in Fig. 9 has barrels 71 clustered about a central bypass passage 72 provided with
20 at least one bleed port 73 associated with the propellant charge 74 of each trailing projectile 75. The ports 73 are provided with plugs as illustrated at 76, which are discharged from the ports 73 when a predetermined pressure is exceeded locally in the barrels 71 so as to bleed the excess
25 pressure to atmosphere through the bypass passage 72.

If desired more than one port, as illustrated at 77, may be utilised to provide a greater port bleed area for extreme high pressures.

It will of course be realised that the above has been
30 given only by way of illustrative example of the invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of the invention as is defined in the appended claims.

THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:-

1. A handgun assembly having:-
a barrel assembly including a cluster of barrels of the type described;
5 each barrel including a longitudinal arrangement of aerodynamically shaped, directional projectiles and interposed propellant charges whereby the barrel assembly has longitudinal arrays or layers of projectiles and interposed propellant charges, and
10 ignition means for simultaneously igniting the propellant charges in a respective layer of propellant charges.
2. A handgun assembly as claimed in claim 1, wherein the
15 barrel assembly includes a replaceable cartridge communicating with fixed barrels supported in the handgun.
3. A handgun assembly as claimed in claim 1 or claim 2, wherein the barrels are clustered about one or more ignition passages extending substantially parallel to the barrels and
20 communicating therewith through longitudinally spaced arrays of transverse bleed passages.
4. A handgun assembly as claimed in claim 3, wherein the ignition passage constitutes a main barrel provided with primer initiation means for selective initiation of the
25 propellant charges therein.
5. A handgun assembly as claimed in claim 4, wherein the main barrel is a central barrel which has a larger bore than the other barrels.
6. A handgun assembly as claimed in any one of the
30 preceding claims, wherein the barrels are clustered about one

or more bypass passages extending substantially parallel to the barrels and communicating therewith through respective pressure sensitive bypass means.

7. A handgun assembly as claimed in claim 6, wherein the
5 bypass means is a valved port in the wall of the bypass passage and communicating with longitudinally spaced arrays of transverse bleed passages associated with each propellant space.

8. A handgun assembly as claimed in any one of the
10 preceding claims and being in the form of a shotgun and having a large number of small bore barrels clustered about the or each ignition passage.

9. A handgun assembly as claimed in claim 8 and being in the form of a shotgun and having a the projectiles formed
15 with reverse wedge sealing means.

AMENDED CLAIMS

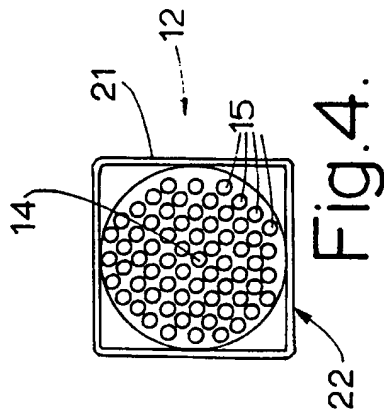
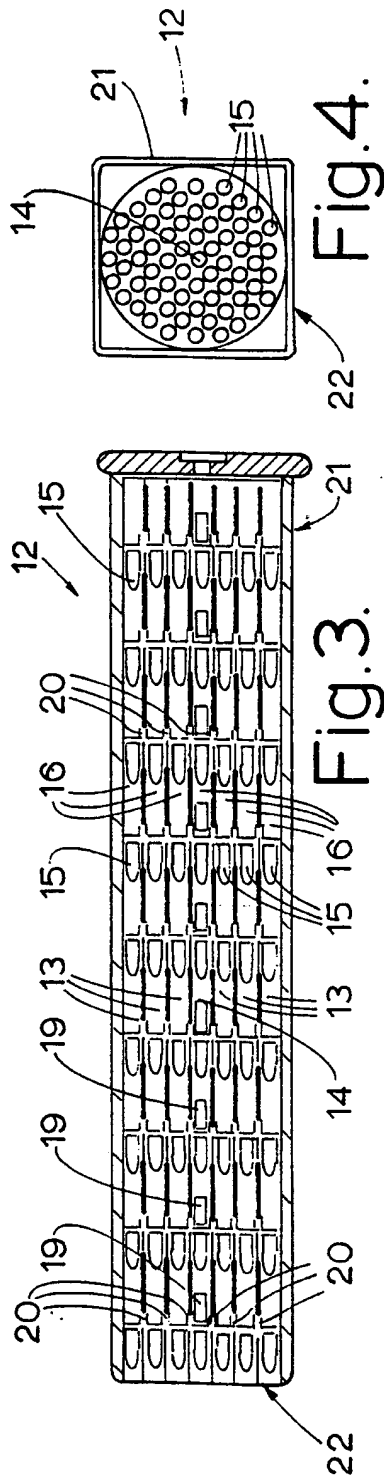
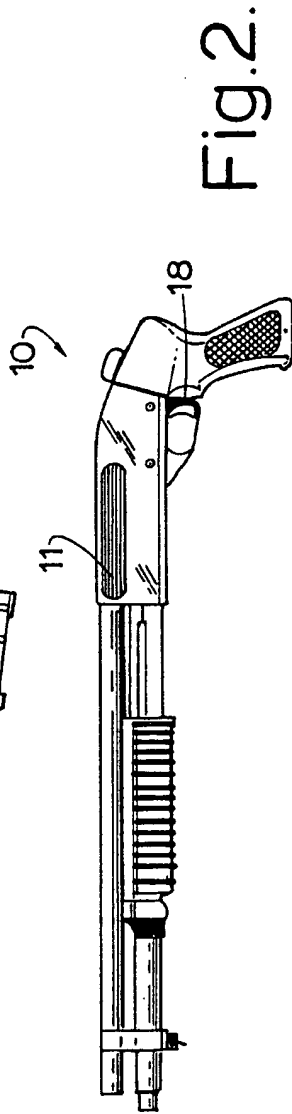
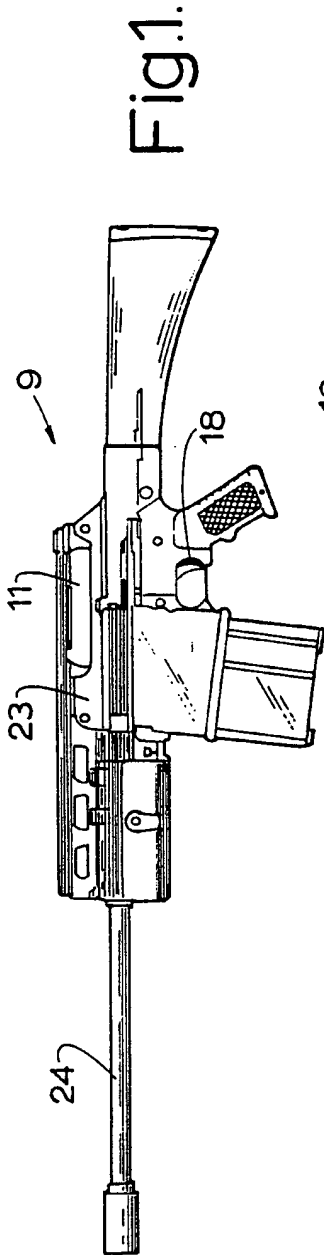
[received by the International Bureau on 22 September 1998 (22.09.98);
original claims 1-9 amended; new claims 1-12 added (3 pages)]

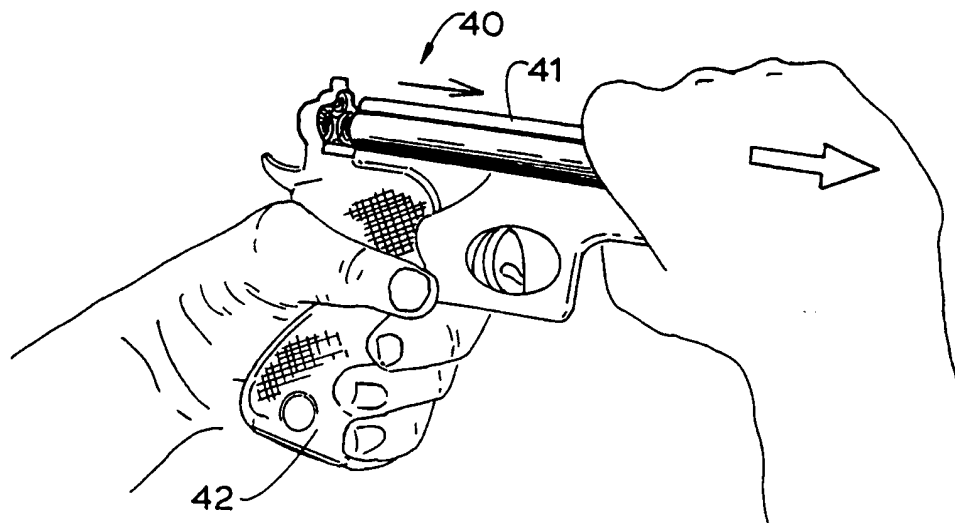
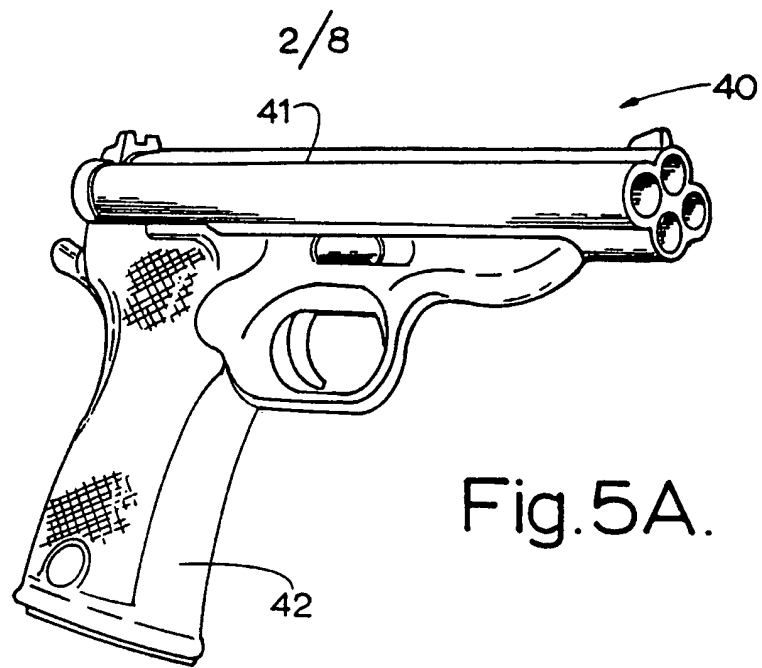
1. A shotgun assembly having:-
a barrel assembly including a cluster of barrels of the
type described;
5 each barrel including a longitudinal arrangement of
aerodynamically shaped, directional projectiles and
interposed propellant charges whereby the barrel assembly has
longitudinal arrays or layers of projectiles and interposed
propellant charges, and
10 ignition means for simultaneously igniting the
propellant charges in a respective layer of propellant
charges.
2. A shotgun assembly as claimed in claim 1, wherein the
15 barrel assembly includes a replaceable cartridge
communicating with fixed barrels supported in the shotgun
assembly.
3. A shotgun assembly as claimed in claim 1 or claim 2,
wherein the barrels are clustered about one or more ignition
20 passages extending substantially parallel to the barrels and
communicating therewith through longitudinally spaced arrays
of transverse bleed passages.
4. A shotgun assembly as claimed in claim 3, wherein the
ignition passage constitutes a main barrel provided with
25 primer initiation means for selective initiation of the
propellant charges therein.
5. A shotgun assembly as claimed in claim 4, wherein the
main barrel is a central barrel which has a larger bore than
the other barrels.
- 30 6. A shotgun assembly as claimed in any one of the

preceding claims, wherein the barrels are clustered about one or more bypass passages extending substantially parallel to the barrels and communicating therewith through respective pressure sensitive bypass means.

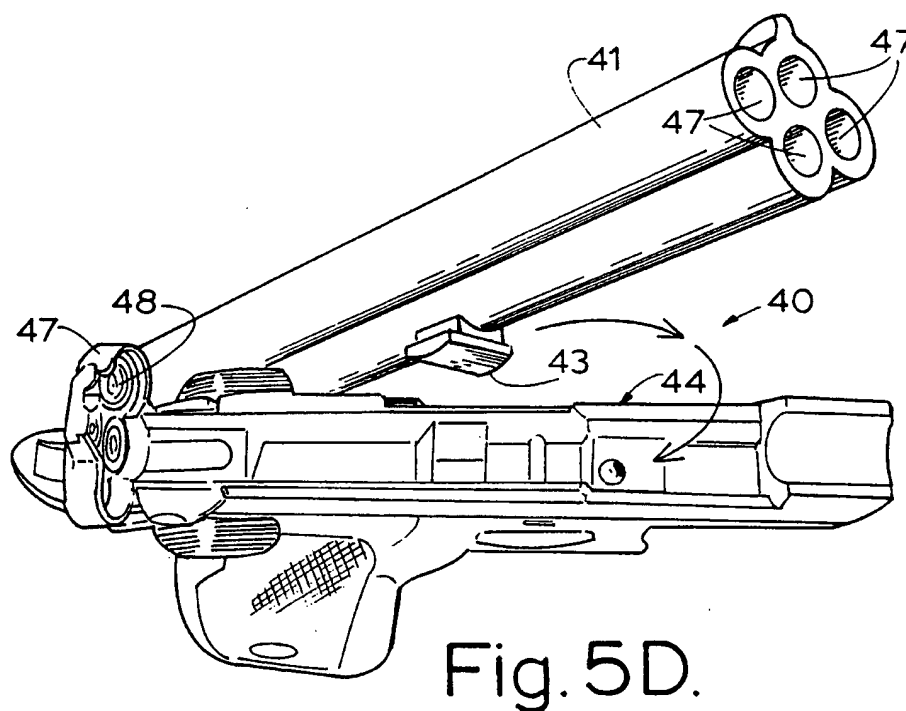
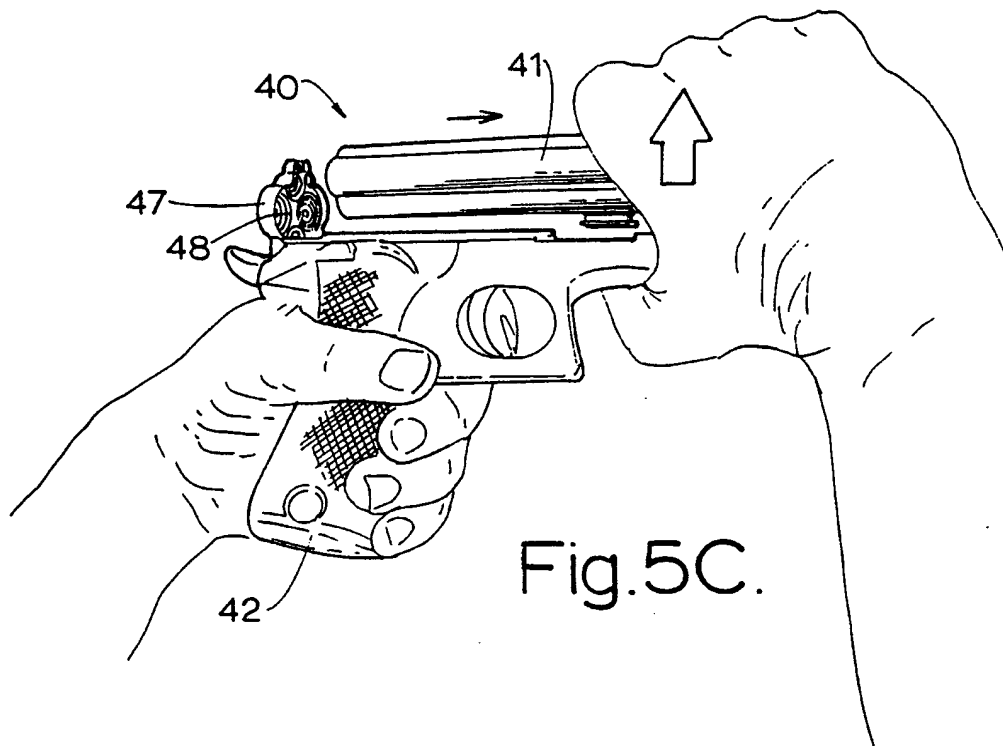
- 5 7. A shotgun assembly as claimed in claim 6, wherein the bypass means is a valved port in the wall of the bypass passage and communicating with longitudinally spaced arrays of transverse bleed passages associated with each propellant space.
- 10 8. A shotgun assembly as claimed in any one of the preceding claims and being in the form of a shotgun and having a large number of small bore barrels clustered about the or each ignition passage.
9. A shotgun assembly as claimed in claim 8 and being in
15 the form of a shotgun and having a the projectiles formed with reverse wedge sealing means.
10. A method of igniting the propellant charges for rounds in a cluster of barrels, including:-
providing an ignition passage containing a longitudinal
20 array of primers and communicating with corresponding propellant charges in the barrels through respective longitudinally spaced arrays of bleed passages, and
selectively and sequentially igniting the primers in the ignition passage to causes ignition of the respective
25 propellant charges communicating therewith.
11. A method as claimed in claim 10, wherein the barrels are clustered about the ignition passage.
12. A method as claimed in claim 10 or claim 11, wherein each communication is through a valved port normally

communicating with a respective array of bleed passages and able to communicate with a bleed passage to relieve excess pressures.





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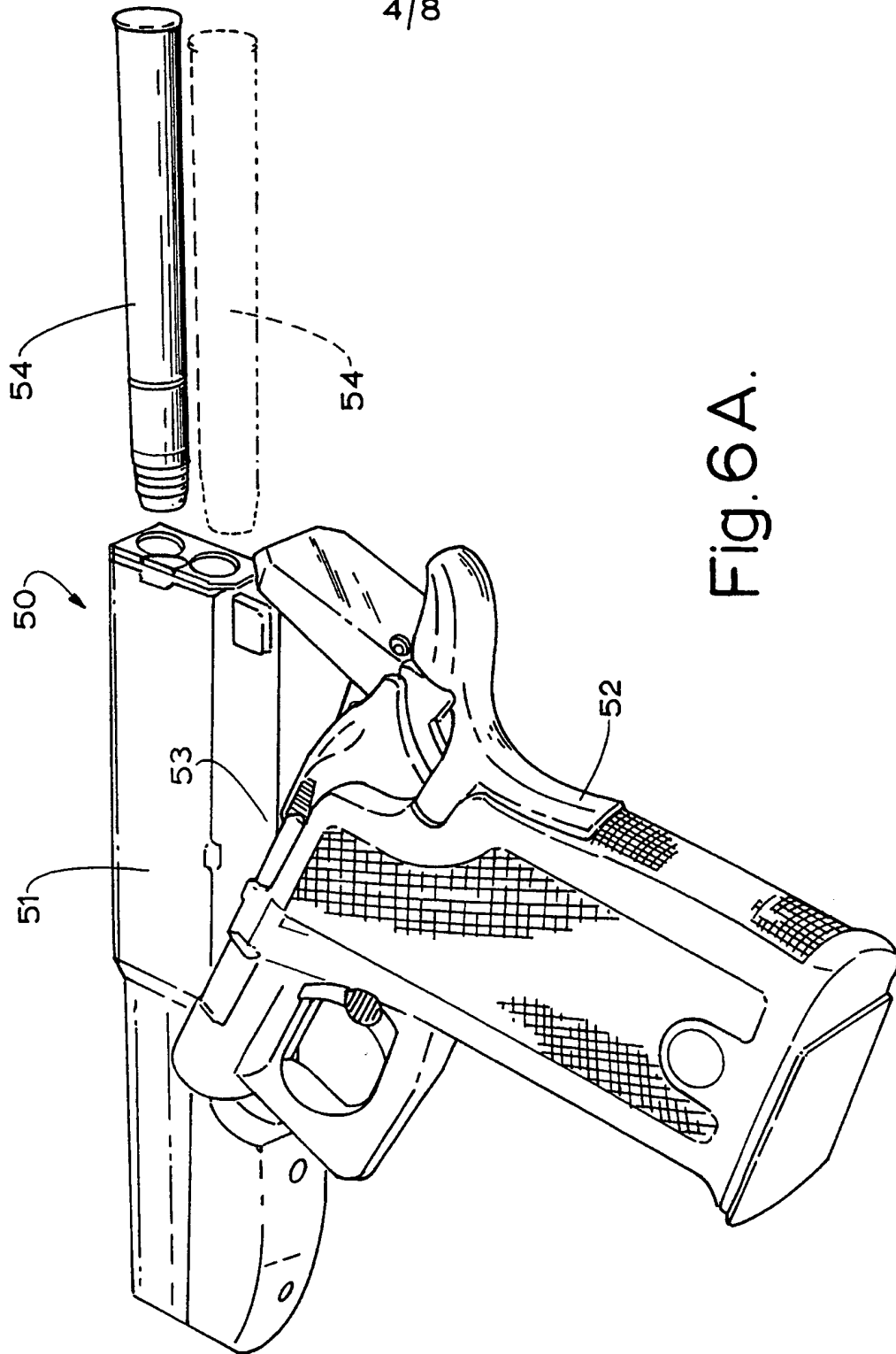


Fig. 6A.

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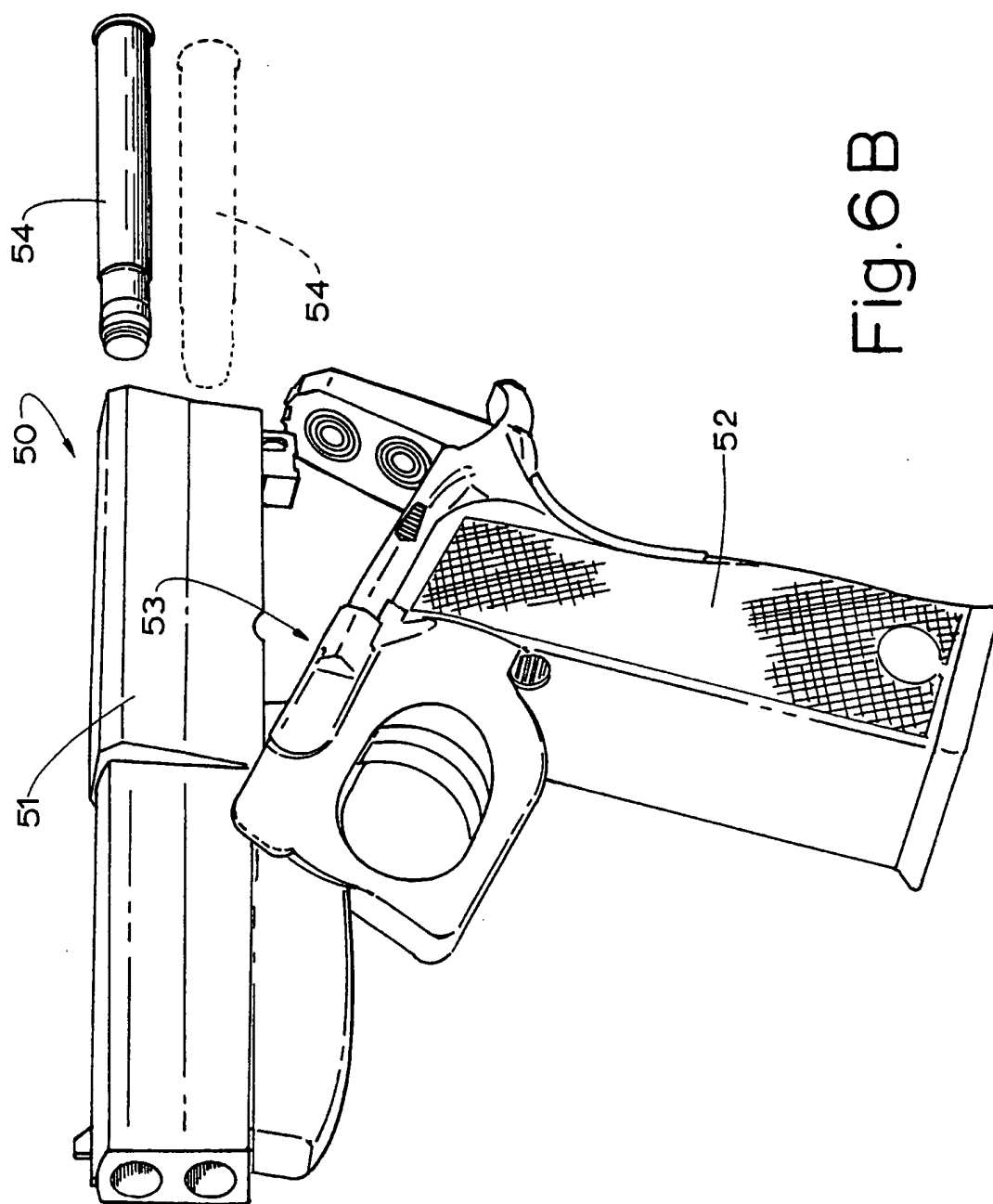


Fig. 6B

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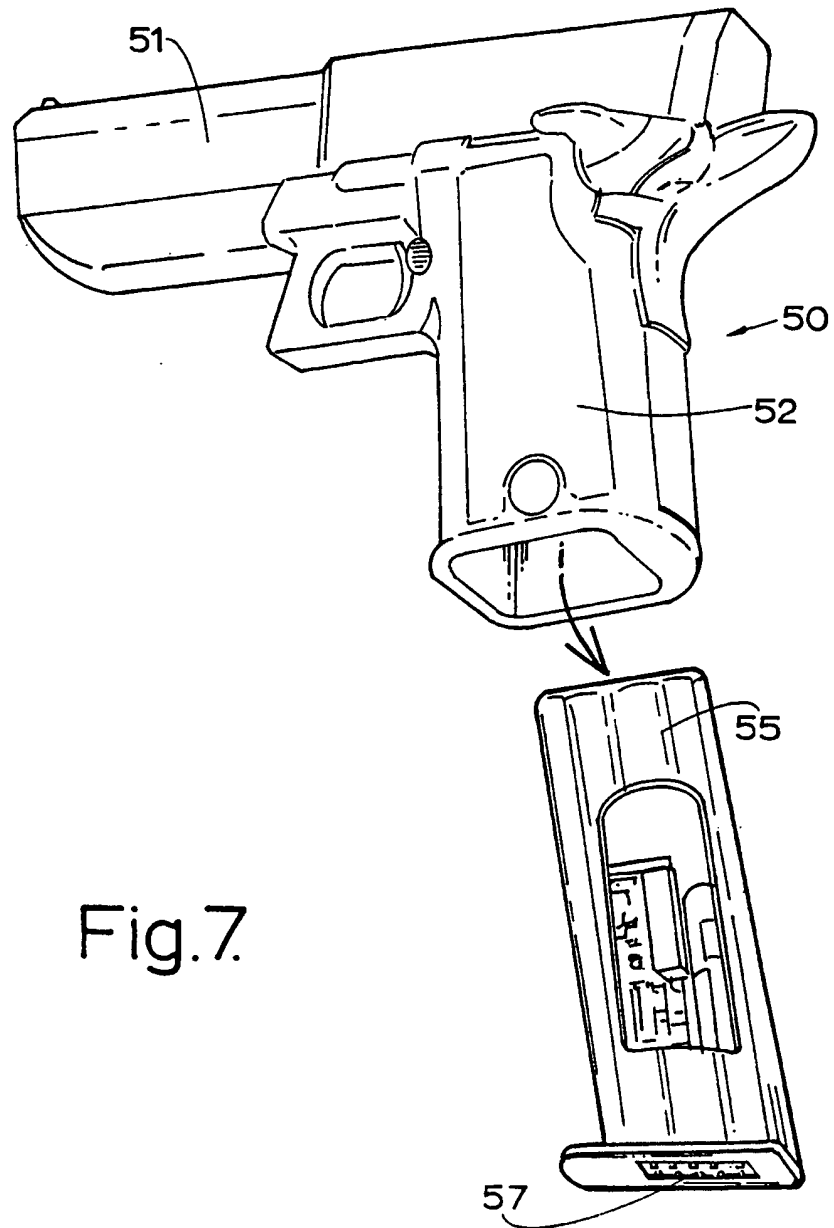


Fig.7

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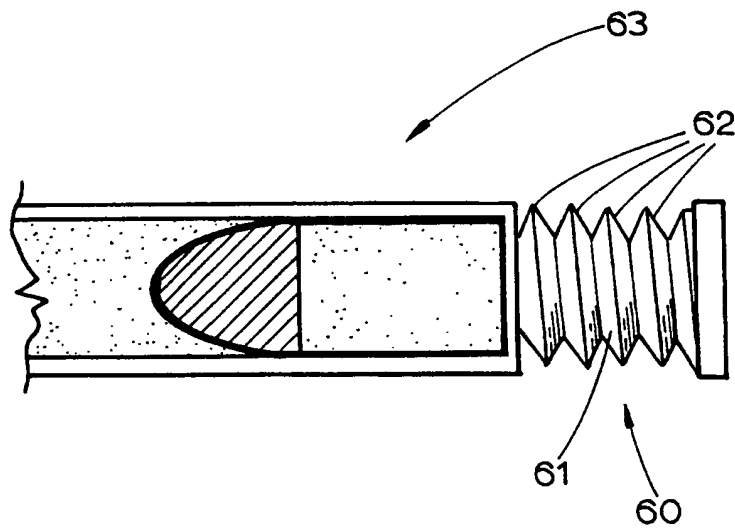


Fig.8.

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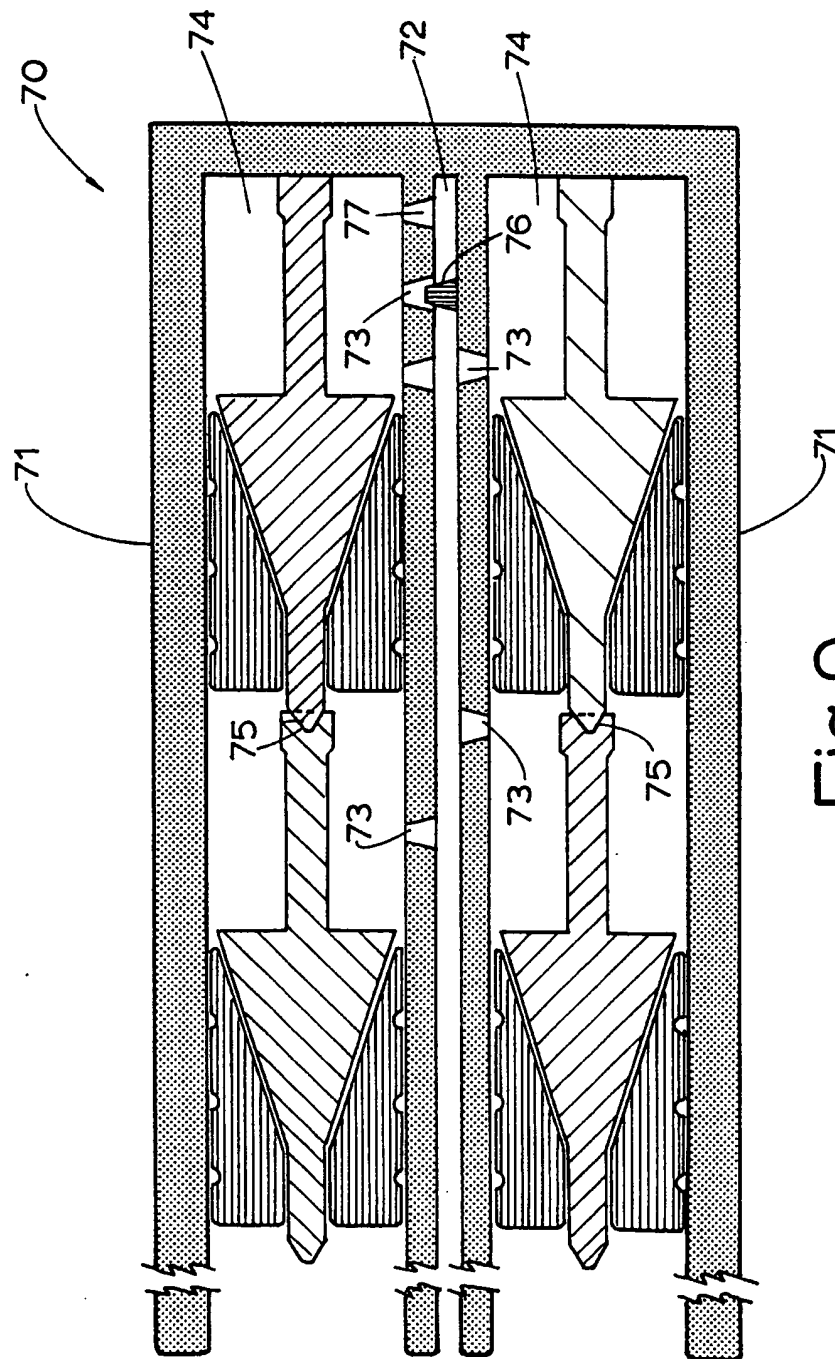


Fig.9.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 98/00415

A. CLASSIFICATION OF SUBJECT MATTER																						
Int Cl ⁶ : F41A 21/06																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
B. FIELDS SEARCHED																						
Minimum documentation searched (classification system followed by classification symbols) IPC:as above and F41C 21/06																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DERWENT WPAT																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
P, X	WO 9704281 (O'DWYER) 6 February 1997 see figures 14a, 16	1 to 9																				
X	WO 9420809 (O'DWYER) 15 September 1994	1																				
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input type="checkbox"/> See patent family annex																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier document but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E"	earlier document but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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"P"	document published prior to the international filing date but later than the priority date claimed																					
Date of the actual completion of the international search 17 July 1998		Date of mailing of the international search report 23 JUL 1998																				
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer J.W.THOMSON Telephone No.: (02) 6283 2214																				

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.
PCT/AU 98/00415

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
WO	97/04281	AU	64097/96	EP	839310		
WO	94/20809	AU	62790/94	BR	9406382	CA	2157882
		CN	1120863	EP	693172	HU	72876

END OF ANNEX

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